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TABLE OF CONTENTS.

Venereal Infections of Animals and Their Effects, by Dr. G. A. Roberts, Raleigh, N. C. ---- 1
Rabies, by Glenn Maris, D. V. M. ---- 4
Parent Status of Infectious Abortion Problem, by L. H. Himmelberger, B. S., D. V. M. ---- 6
A Case for Diagnosis, by E. E. Coshow, D. V. M. ---- 10
The Red Blood Corpuscles—Are They Disk-shaped, Or Bell-shaped? ---- 11
Infectious Anemia In Horses, by R. M. Johnson, D. V. M. ---- 12
Resistance to Infection ---- 13
Leucorrhea, Or. So-called Whites, by W. A. Martin, D. V. M. ---- 14
The Quantitative Relationship of Milk-Borne Infection In the Transmission of Human Communicable Diseases, by Eugene Kelly, M. D., Boston, Mass. ---- 15
I. V. C. A. Notes ---- 20
Annual Meeting of the Indiana Veterinary Medical Association ---- 21
Poisonous Properties of the Marsh Marigold ---- 22
Class Notes ---- 23
Alumni Notes ---- 28
Editorial—Opportunities for the Veterinarian ---- 30
Obituary—Clyde C. Sipe ---- 31

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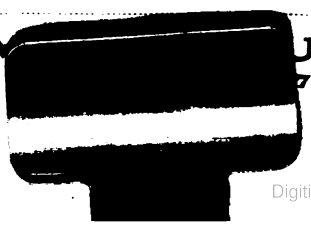

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THE BULLETIN

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Volume III. INDIANAPOLIS, IND., FEBRUARY 15, 1917 No. III.

VENEREAL INFECTIONS OF ANIMALS AND THEIR EFFECTS.*

By DR. G. A. ROBERTS, Raleigh, North Carolina
Veterinary Department, A. & M. College

Our observations in various parts of the United States and numerous reports from this country and abroad for a number of years have indicated a rapid and extensive growth in the number of abortions in all classes of domestic animals, horses, cattle, sheep, swine, etc. But this is not all, for with the abortions, have likewise been noted a great number of retained afterbirths in cattle, due to the peculiar anatomical arrangement and a much greater number of sterilities in all classes of animals. Also, where the abortions have been most numerous in cattle, a granular inflammation of the mucous membrane of the vulva, and sometimes of the vagina, has appeared invariably. The fact that where any of the above troubles exist, the others being usually present, has led many investigators to look for a common cause for these phenomena.

The evidence points strongly to the possibility of a specific organism, the Bacillus of Bang (B. abortus), as the agent causing most of the abortions, early and late, in cattle, including premature births, still births and birth of weaklings; all retained afterbirths, with many inflammations of the uterus not attended by visible signs of retained afterbirth, and a large percentage of all sterilities, both temporary and permanent.

The part played by this germ, if any, in the granular venereal disease, certain udder diseases, etc., has not been determined, but in any event, the term "contagious abortion" is very inappropriate to indicate the total effects of this infection. Many other animals affected with venereal infection, neither abort nor show any other external evidence of infection, while, on the other hand, all of the above determined conditions may result from it.

Formerly, it was thought that the causes for abortion were almost as numerous as the abortions themselves, such, for instance, as fright, falls, injuries, green or moldy feed, cottonseed meal, purgatives, etc. Also the so-called abortificients as pituitrin, ergot and gossypium had a like reputation, but none of these agents produce such results when desired, unless by coincidence the mouth of the uterus is mechanically opened or opened from result of uterine infection. In this way, some of the above agents may aid in precipitating an abortion, but it is doubtful if any one within itself is sufficient cause.

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If one will visit an abattoir, after seeing the rough and excitable handling of cattle in loading, shipping, unloading, slaughtering, etc., and observe the number of pregnant cows killed, he will appreciate the necessity of other factors than fright and injuries for causing abortion. Again, if one will study the anatomy and physiology of the parts involved, he will note the wonderful provision nature has made for avoiding premature expulsion of fetus or embryo from the uterus. He will likewise observe difficulty in accounting for such accident on other grounds than infection or artificial openings of the mouth of the uterus. Abortions can be readily accounted for, however, from these latter causes.

The organism, B. abortus, may be found in the bodies of aborted fetuses and other infected ones, and in milk from many of the infected cows and in the abortion exudate within the uterus. Shroeder and Cotton found the organism in nearly 14 per cent. of 217 samples of milk on the Washington, D. C., market, in 31 per cent. of samples from 35 cows in one herd. In order that abortion shall occur, however, the organism must be within the uterus. It may get there possibly through the circulation, in the heifer infected prenatally or from contaminated raw milk, or get there through the vaginal route at the time, or before conception occurs. Even when lodged here, however, it may not be active enough or be specifically located so as to cause sufficient alterations near the mouth of the uterus to allow expulsion of the fetus.

The history of many herds shows as high as 50 per cent. or more of heifers aborting during their first pregnancy, and often 50 per cent. of all abortions in the herd are during first pregnancies. In most instances the infected cow shows a growing tolerance so that there is less likelihood of aborting the second time, much less the third and rarely the fourth, although they continue to be carriers of the infection. The yearly number of abortions in many herds may be quite variable. Some years there may be no abortions or very few; the next year, all pregnant cattle may abort like a storm wave. The services of some bulls seem to be attended by more abortions than those of others, indicating a more virulent infection in some cases.

The recognition or diagnosis of this infection in a cow or herd is in most cases overlooked unless numerous abortions occur. As above indicated, however, many infected animals may never, or do not always abort. The lack of evidence of infection can readily be illustrated in other infectious diseases, such as in many cases of tuberculosis, especially in cattle, where the infection may exist for a long time without showing any clinical symptoms. As yet, no satisfactory method for recognizing all infected cattle has been suggested, though many of them can be determined by subjecting the blood serum of such cattle to biological tests, as the agglutination and the complement fixation tests. If these tests are re-applied at frequent intervals, most cases of infection can sooner or later be detected.

Retained afterbirths are common only in cattle because of the peculiar anatomical connections between the maternal and fetal placentae. If abortions occur before about the fifth month of pregnancy, there will be little or no retention because of the slight development of the villous projections on the fetal placentae. On the other hand, the longer the fetus is carried, the more developed the villi, and with the resultant inflammatory products of the infection the greater will be the retention.

Sterility may be due to other causes than this infection, but investigators in this country and abroad, estimate ninety per cent. or more of such due to venereal infection. In many herds,

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the losses are much greater from sterility than those resulting from abortions or retained afterbirths. The total losses from this infection to the cattle industry is unknown and difficult or impossible to determine, but it is perhaps safe to say that the losses in dairy herds are greater than from any other single infection.

The alterations resulting in sterility most often occur in the ovary, the uterus or vagina. In many cases of sterility, it is noted that a persistent yellow body (corpus luteum) exists in the ovary which probably produces an internal secretion inhibiting any egg production (ovulation). Again, many of these yellow bodies are observed in a state of cystic degeneration, which in many cases, terminate in conspicuous cysts. Such animals are nearly always more or less continually in heat (nymphomaniacs) and rarely conceive. Sterility of entire males is rare.

The mucous membrane of the uterus may be so altered as to prevent implantation of the fertilized ovum upon it or it may be dislodged and expelled at a very early period. This latter accident may not be noted by the herdsman and the case often be taken for one of sterility rather than abortion. Many cases of supposed sterility are, in fact, early aborters. The mucous membrane of the vagina may likewise be altered, or at least the secretions from it, so as to destroy the vitality of the male element. There is very little sterility of the male animal, but many dairy men report 50 per cent of cows difficult to get with calf, and some report 75 per cent or more.

A personal investigation was made the past year of fifty herds in North Carolina, numbering 1,700 head of cattle, located at twenty-five points between the mountains and the coast. The results were similar to those obtained from like investigations in other states and countries, viz: that few herds are free from venereal infection. Laboratory tests were made on 203 samples of blood from cattle. The result was 65 per cent positive, 17 per cent negative and 18 per cent suspicious, making 83 per cent possible infection.

For comparison of a similar infection in the horse, the following history was obtained of the service of one stallion: During the year 1914, the horse was bred to 113 mares. Sixty-five of these mares became pregnant. Six of them were known to have aborted and it is possible that others did also. This number makes nearly 10 per cent abortions. Some foals were born dead, others lived only a short time. Forty-four of the mares were served two or more times and four of them were bred numerous times during the summer and fall without result.

Likewise, observations and inquiries indicate similar trouble in hogs. The following letter was recently referred to the veterinary department of the experiment station: "I have had trouble with my hogs for more than a year. I have changed both sexes of my stock several times. They have free range of pasture, but my sows have trouble with their pigs. Some of them abort their pigs, others give birth to dead pigs and the pigs of others die when a few days or weeks old. Many sows I cannot get to 'catch' at all. I bought a male hog from the western part of the state some time ago and have had these troubles ever since."

Treatment for this infection and its manifold results is far from satisfactory, yet a few valuable facts have been determined both as to the fallacy of past suggestions and as to the agencies to be employed in the future. It may safely be stated that since the infection is so widespread, and there is difficulty in recognizing the infection in many cases, it will be impossible to depend on purchasing animals free from infection. It

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cannot, therefore, be eradicated by simply disposing of or isolating all aborting animals. Neither can the disease be controlled or eradicated by the use of the formerly advocated specifics, carbolic acid and methylene blue, administered as previously directed.

Its control will depend largely upon a knowledge of the sources of infection and other characteristics of the disease. In the first place, it must be borne in mind that the infection may occur in the animal before birth, or after birth from the ingestion of raw contaminated milk or from a service by an infected animal. Again, it must be borne in mind that abortions are usually confined to the first and second pregnancies and that after aborting once or twice, most of them seldom do so again—a tolerance for the infection is assumed.

With our present knowledge, the control or partial control of abortions, retained after-births, and many of the sterilities will depend upon diligent flushings of the vaginas of the females and the sheaths of the males with mild antiseptics. The once popular "yeast culture" treatment for sterility was probably due to its antiseptic or neutralizing effect. Other agents, as milk curdled by the lactic acid organism, one-half of one per cent solution of Lugol's Solution and three-fourths of one per cent solution of lysol have been recently advocated for such purposes.

Diseases of the ovaries cannot be corrected, however, through vaginal douches nor by internal administration of drugs. We have apparently obtained some good results, and others have made like reports, from surgical measures. These may consist, where only one ovary is involved, of removing the diseased ovary, or where one or both are affected, of the manipulation and massaging of the affected ovary through the rectum. This manipulation may effect an expression of a superficially located persistent corpus luteum from the ovary, the rupture of a thin-walled cyst or the massaging may aid nature in making or hastening repair. If the animal remains sterile, following a reasonable number of treatments to correct the specific cause of the barrenness, then she should be disposed of for beef.—A. J. V. M.

* Paper read before the N. C. Academy of Science, April 28, 1916.

RABIES.*

By GLENN MARIS, D. V. M., Member of Graduating Class of 1916, Indiana Veterinary College.

Rabies is an acute contagious and almost without exception, fatal disease, affecting all animals. It is characterized by increased nerve irritability and symptoms of paralysis. The disease is usually transmitted by the bite of an affected animal to other animals, as well as man.

The disease and its contagious nature as well as the danger connected with the bites of mad animals, have been well known since the time of Aristotle; but up to recent times, there has been a certain belief in its spontaneous development. In fact, it was supposed that hot feed, lack of drinking water, unsatisfied sexual desire and violent nervous excitement, might cause the disease. By means of inoculation experiments the infectiousness of the saliva was determined in the dogs by Zinks in 1804.

The investigations of Pasteur proved that the purest and most concentrated virus is contained in the central nervous system; he also established a method for the attenuation of its virulence and solved the important question of protective vaccination against the disease.

Remlinger and Riffet-Bey produced typical Rabies in six out of nineteen

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rabbits with a filtrate of highly diluted brain emulsion which passed through a fairly porous Berkefield filter.

According to the results of these experiments which were later confirmed by other bacteriologists, the virus of Rabies must belong to the filterable microorganisms.

The attempts at cultivation which have thus far been unsuccessful, justify the supposition that it multiplies only in the tissues and fluids of the body.

In 1903 Negri found in dogs and rabbits inoculated with virus, and also in animals which have died or have been killed after natural infection small, round, oval or three cornered inclusions in the large ganglion cells of the Hippocampus major; in the Purkinje cells of the cerebellum; in the ganglion cells of the cerebral cortex; pons; medulla oblongata, and sometimes also in the nerve cells of the spinal ganglia and spinal cord. The structures now known as Negri bodies are 1 to 27 M. long, 1.5 to 5 M. broad and appear red in color when stained with methylene blue. Negri believes that these bodies, which have been found exclusively in rabid animals and humans are the parasites of rabies, because among other reasons they appear in the nerve cells only 14 to 23 days after artificial infection, and resist both putrifaction and the effect of glycerine.

By the inoculation of virulent saliva or oblongata emulsion the disease may be transmitted to dogs, cats, guinea pigs, rabbits, mice, rats, and also other mammals. The best results are obtained by the injection of the virus under the dura mater of brain or cord; into the brain substance; into the anterior chamber of the eye, or into the muscles. Rubbing the virus into the scarified skin of dogs and rabbits is successful in only 50% of the cases. Natural infection is generally brought about by the bite or a rabid animal, whereby the virulent saliva is inoculated through the wound into the subcutaneous tissues, muscles or nerves. In rare cases the contagion has been introduced by licking wounds and skin abrasions.

The danger from a bite depends on the one hand on the virulence of the saliva. On the other hand upon the size; that is the depth of the wound, and further on the number of nerves and lymphatic vessels in the wounded part of the body. Large wounds offer large surfaces for absorption, and from small but deep wounds, the virus once entered, can hardly be removed, while from small, superficial wounds it is easily removed by means of bleeding.

After the bite of rabid animals the disease follows only in a portion of the cases, hardly more than half. There is a possibility that the contagion will not reach the wound, or may be carried away by bleeding. Besides the rabitic virus may be destroyed without causing the disease after having entered the body.

If the virus becomes introduced in some part of the body, through bites or artificial infection it penerates, as a rule, along the nerve tracts of the involved part of the body toward the central nervous system, usually without entering the circulation.

The period of incubation of rabies after a natural infection is generally several weeks, but may be several months. Its duration is influenced by the virulence of the virus, the distance of the place of infection from the central nervous system, and the age of the animal. Generally the first symptoms appear 2 to 8 weeks after the bite; sometimes, however, they occur as early as the end of the second week or again only after some months and as late as one to two years. In dogs and swine the period of incubation is generally brief, frequently not longer than 10 to 15 days. In horses and cattle it is longer mostly one to three months. The disease developes

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earlier in young animals than in old ones.

Rabies which has already developed cannot be arrested or changed in its course. More successful is the treatment of wounds from bites for the purpose of preventing the future development of rabies, by destroying the infectious saliva already introduced.

One of the most effective methods consists in having the wound bleed profusely, because the flowing of blood washes the virus out of the tissues. At the same time it is advisable to wash the wound with a disinfectant solution. In cases where the wound comes under medical observation late destruction of the contagion may be attempted by means of a red hot iron, or of caustics.

Pasteur's method of protective vaccination nearly always used in human victims consists in taking 2 mg. of the dried substance of the spinal cord of rabbits dead of rabies after inoculation with fixed virus triturating it with sterilized bouillon into an emulsion and then injecting it subcutaneously in the abdominal region. The first injection is made with the spinal cord dried for 14 days, and then the substance dried one day less is injected at first every half day, and later every day, until finally the cord dried for only three or even two days is injected. The inoculation with the cord dried 5; 3, and 2 days is repeated once or twice, especially in the case of wounds from bites on the head. This method has been applied with favorable results on dogs.

* Read before the Indiana Veterinary College Association.

PRESENT STATUS OF THE INFECTIOUS ABORTION PROBLEM.

By L. R. HIMMELBERGER, B. S., D. V. M.,
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Epizootic abortion has received a great deal of attention from both American and European investigators, and is considered by many to be even a greater menace to the live-stock industry than tuberculosis. It is not the purpose of this paper to report any original research, but merely to review the more recent literature concerning progress being made with a general view to combat the disease.

Investigators differ as to the extent of the distribution of epizootic abortion. Thus, Williams, believes and insists that every dairy herd worthy of the name is infected, and furthermore, every cow in the herd is infected. There is, no doubt, some foundation for such statements, but, nevertheless, it appears that statements of this character are a bit too broad. The writer has repeatedly tested cows in large dairy herds without the slightest suspicion of reaction resulting to either the complement fixation or agglutination tests. There is every reason to believe that the condition known as infectious or contagious abortion is epizootic in a great majority of the dairy herds of this country as well as Europe, and that this condition is caused by a micro-organism known as bacillus abortus, first isolated by Professors Bang and Stribolt, of Denmark, and reported in 1897. There is a generous amount of literature supporting the work of Professor Bang, and this etiological factor has been studied and isolated by many institutions in Europe, including the British Commission, whose report in 1908 confirms the existing opinion that the infection was widespread in England. The work of McNeal, Good, Giltner, Hadley and others is proof of its great prevalence in the United States. The disease has been recognized in South Africa.

There is another condition considered by some to be closely related

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to infectious abortion. This condition is generally known as "infectious granular vaginitis." Williams and others are convinced that the presence of vaginitis in a given herd is evidence of the presence of epizootic abortion. According to Zwick, this condition is not considered to be a cause of abortion. We have seen it present in herds which have never had a history of abortion and in which blood samples gave no reaction to either the complement fixation or the agglutination test.

Considerable controversy exists at present regarding the avenues by which bacillus abortus (Bang) gains entrance to the animal body. According to the work of the British Commission, an animal may be infected with abortion by the injection of virulent material or active cultures into the blood stream. It is also possible to infect animals by subcutaneous inoculation of considerable quantities of infective material. These, however, are, of course, unnatural avenues of infection. Naturally, the abortion organism may gain entrance either by way of the genital passages or by way of the mouth. Surface has also shown that it is possible to produce infection by introducing material in ways other than by way of the vagina. Williams insists that the most prevalent and perhaps the only way in which the pregnant animal becomes infected is by way of the vagina previous to the sealing of the os. This method of infection has always been supposed to be the natural method. Infection by the use of infected sires is considered by some the most frequent way in which the disease is spread. It has been proven beyond question, however, that infection may be established after conception and in advanced periods of gestation. The part played by the sire in spreading infection is, of course, difficult to ascertain. When it is considered, however, that infection can be brought about by the ingestion of virulent material, circumstantial evidence which previously pointed to the bull as a factor of almost exclusive importance is weakened to the extent of putting the sire in a secondary role as a spreader of the disease. For example, aborting cows on pasture infect the pasture to a greater or less extent, which, in case of its being consumed by other animals, in a short time would be capable of establishing infection. It must be borne in mind, however, in this connection that the infected material is not discharged in any considerable quantities before the act of abortion. It is quite possible that an animal which has aborted may be a source of infection for a considerable length of time subsequent to abortion. Stockman takes the position with regard to bovine abortion that infection "takes place most frequently and surely by way of the alimentary tract, owing to the animal swallowing infected food or water or licking infected material on the bodies of others or elsewhere. It is also theoretically possible, however, that a cow may be infected by the contaminated penis of a bull at the time of service, but it seems very doubtful if the pregnant uterus of a non-infected cow can become infected by the bacillus of bovine abortion traveling up the genital organs from without, and in this connection it has to be remembered that the bacillus of Bang is non-motile." As regards infection by way of the genital tract, introduction of virulent material from soiled gutters, etc., is quite improbable. A consideration of this subject would be incomplete without mention of the possibility of the bacilli persisting in the womb from one abortion to the date of the next pregnancy.

We are supposed to have at our command methods for the diagnosis of this disease which are reliable. Microscopic examination is to a certain extent unreliable. The methods of

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complement fixation or agglutination used in the diagnosis of other diseases in both man and domesticated animals have been applied to this disease more or less successfully. Surface, Hadley, the British Commission, Zwick and others were the first to apply these methods in the diagnosis of epizootic abortion and vouch for their reliability.

Abortin, a preparation similar to tuberculin, has been used by the British Commission, Giltner and others in attempts to establish its value as a means of diagnosing this disease. Thus far, the preparations used have not given much promise. It is suggested that their refinement might lead to more reliable and constant results. According to Zwick, the agglutination and complement fixation tests are of value in establishing the presence of infection in cattle. Moussu in a communication in the Tenth International Veterinary Congress at London, in 1914, maintains that methods of diagnosis, based upon the use of abortin, the agglutination and complement fixation tests, have proven of no value. Stockman attaches great importance to the complement fixation and the agglutination test in diagnosing the disease in cattle because cattle may become infected with two distinct infections, viz., the bovine infection and the ovine infection. It is, no doubt, established that these two methods are of value in the detection of the disease, provided a reliable antigen is used.

Methods of prevention which are now in use are numerous. One cannot consider the treatment or prevention of this disease without at least making mention of attempts at the use of chemo-therapy. For a number of years phenol or carbolic acid was regarded as specific for this disease. This treatment has very slender claims for its existence. It is now accepted by most authorities that its use is impractical and unjustifiable. Experiments performed by the British Commission have proven it to be of no value whatever.

Methylene blue has also been given a prominent place as a preventive of this disease. Its present status is, of course, in question, but there is no reason to believe from the theoretical point of view that the administration of this material results in the destruction of bacilli which may be present in the pregnant uterus. While the material is eliminated through the kidneys, there is no reason to believe that any of it reaches the uterus, though somewhat astonishing results have been obtained in various herds by its use, but would not the same results have been obtained without its use? Furthermore, are not some of the results credited to its favor due to an immunity acquired as the result of a previous abortion? It must also be considered that in the use of methylene blue expert advice is usually obtained by the owner. Such advice usually includes instructions for sanitary precautions which may be responsible for many of the good results obtained by its use.

At present, great attention is being given to immunization as a possible solution of the problem. When it is considered that the majority of aborting cows do not abort at two or three successive pregnancies, it must be admitted that this is, no doubt, due to an active immunity established and immunization offers the most promising solution of the difficulty. It is true that some animals do abort twice and a lesser number will abort three successive times. This would indicate that an immunity had not been established by the first infection. The disease is, no doubt, a chronic one and must be treated as such. Therefore, it is necessary to conclude that a considerable time elapse and the animal subjected to considerable exposure before an immunity is built up. McFadyean and Stockman, in

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experiments carried on and reported under the British Commission, used large doses (in some cases as much as 125 c. c. of bacterial suspension) of killed cultures for the purpose of immunization. Several animals were used in their experiments and the results obtained were promising. In a few cases, however, a protection was not produced, but when it is considered that the experimental animals were subjected to immense quantities of virulent material, quantities greatly in excess of those which an animal would naturally secure, their results would seem to indicate that the method has a promising future. Stockman, in a later report (1914), gives the results of experiments in which both living and dead cultures were used in attempts at immunization. While better results were obtained with living cultures, than with dead cultures, the former is too dangerous a procedure to be adopted generally, and it seems that dead cultures constitute the only hope of immunization. Bevan, in a report of work done in South Africa, shows that immune bodies were produced in large quantities by the subcutaneous injection of large doses of dead organisms. He showed that the intensity of the reactions varied with the number of organisms used. This brings up the question as to whether or not immune bodies have any relation to actual resistance. There is reason to believe that the agglutinating titre of a serum may be some indication as to the resistance possessed by that animal; however, it is a disputed question. Hallman conducted experiments with both living and dead cultures and found that the use of living cultures was apt to result in sterility and that there was little to encourage one in the use of dead cultures. In view of the experience of English workers, however, it must be taken into consideration that Hallman used but 10 c. c. of bacterial suspension, injected at intervals of two weeks, the number of dead organisms being 45,000,000,000 per c. c. It can be seen from this that his doses were much less than those used by English workers. In reviewing the immunization experiments performed by the various workers, one is forced to the conclusion that the injection of dead organisms may prove of value.

It is conceded that the treatment of the aborting animal is of exceeding importance to her future usefulness. In cases of abortion it is usually necessary to remove the placenta manually. This necessarily increases the chance for a contamination of the uterus with micro-organisms of secondary importance and which may play an important role in the production of a metritis, resulting in subsequent sterility. The work of Wall has shown conclusively that the abortion infection of the uterus is not as serious as the resulting secondary infection. These secondary invaders may be involved in perfectly normal parturitions and sterility result. This may account for a great deal of the sterility that evidently has no connection with an abortion history.

Giltner and Himmelberger, in a publication in 1912, showed the value of lactic acid prepared from pure cultures of lactic acid bacteria in milk as a local treatment in cases of infectious abortion. Recently, Giltner again calls attention to "the hopeful field of lactic acid therapy." There is reason to believe that the ordinary chemical antiseptics exercise a bad influence upon the mucous membrane of the genital tract. This fact has not been noted when lactic cultures have been used. The main trouble with this treatment is the difficulty experienced in conveniently securing the material in sufficient quantities.

The Disease in Other Animals.

Infectious abortion in mares and ewes has also received considerable

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attention and is, no doubt, of great economic importance. Good was the first to isolate the etiological factor of this disease in mares, and 1911 reported it to the United States Live Stock Sanitary Association. The organism, which Good named bacillus abortivo-equinus, belongs to the colon typhoid group and the part played by it in abortion in mares has since been confirmed by other workers both in America and Europe. The disease in mares appears to be susceptible to the prosecution of research to a more successful end, in that it has been possible heretofore to combat the various conditions arising from infections of this type of organism. Good and Smith have produced an immune serum which will protect rabbits against a lethal dose of the organism. B. abortivo-equinus has also been isolated from cases of joint ill and it has been the experience in many studs to have foals, whose dams aborted the previous year, develop an articular trouble.

The disease in sheep is said to be caused by a vibrio, and Stockman considers the bovine animal susceptible to this infection. It seems remarkable that a disease affecting three species of animals and very similar in many ways should be caused by a different etiological entity in all three species.

Good and Smith, in a very recent publication, report the isolation of B. abortus Bang from sows suffering from this disease. This is the first time, to the writer's knowledge, that the Bang bacillus has been definitely incriminated as a cause of abortion of brood sows. This is, indeed, an important contribution to veterinary science, for should the distribution of the Bang bacillus become widespread among the pure bred swine herds of the country, as it has among the pure bred dairy herds, the losses possible would be appalling.

From the foregoing brief consideration of the progress being made as regards the methods of fighting infectious abortion, it will be seen that for the present recourse must be had to disinfection, sanitation and possibly immunization. For the prevention of sterility, local treatment of the aborting animal should be practiced to prevent any changes in the uterine mucous membrane of an inflamatory nature.—Amer. J. V. Med.

A CASE FOR DIAGNOSIS.*

By E. E. COSHOW, D. V. M., Member of Graduating Class 1916, Indiana Veterinary College.

Last summer, I was called to see a mare, which was due to foal. She seemed to be in a great deal of pain, had no temperature, was bloated some and would lie down and get up every little while. On getting the history of the case, I found she had been struck and knocked down by lightning the evening before, but got up and seemed alright and ate her feed. She had been worked hard all summer, up until about a week before the accident.

Her rations had been corn and shredded fodder. I gave her two ounce doses of Linseed-oil, Turpentine, and Salicylic acid combined, every twenty minutes for three doses, and then gave it every three quarters of an hour. She seemed to get better in a short time and I returned to town. That night the owner called me out to deliver the mare of a colt, which was dead. After the colt was delivered she seemed easy, and all right.

The next morning about 10 o'clock, the owner called, and said the mare was weak and could not urinate, I went out and drew her urine, which was highly colored, as in Asaturia. I flushed out her uterus, and gave her one-half grain of strychnine and two ounce doses of bicarbonate soda, and Pot. Nit., and Aqua combined

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THE RED BLOOD CORPUSCLES—ARE THEY DISK-SHAPED OR BELL-SHAPED?

The classic description of the red blood corpuscles, or erythrocytes, of man and mammals refers to them as minute circular disks with biconcave surfaces and rounded or convex edges. These cells apparently exist within the blood, floating in the plasma, in a state of osmotic stability; that is, the plasma is an istonic solution in relation to the red corpuscles. From time to time one hears of the bell-shaped or cup-shaped red corpuscles in mammalian blood ;and the contention has now and then been made that this is in fact the normal or natural form of the blood cell and represents the type which actually circulates in the intact blood stream. This is the conclusion derived from statements of Weidenreich and of Lewis. It has been claimed that blood examined immediately after withdrawal on a warm slide is favorable for the demonstration of cups. According to this view, the assumption of the familiar disk-shape depends on an almost instantaneous change due to the evaporation and concentration of plasma before the preparation can be made and examined.

Cup-shaped erythrocytes can unquestionably be found in microscopic preparations of the blood under certain conditions. The problem narrows itself to the inquiry as to which of the two known forms actually represents the true or normal shape of these formed blood elements. Jordan has presented evidence in refutation of the new teaching that the normal shape of the mammalian red blood corpuscles is cup-form. This evidence includes data derived from an examination of the capillaries in the omentum of an anesthetized animal, sections of variously fixed tissues, and hanging drop preparations of fresh blood. The latter, sealed and kept at body temperature, were thought to simulate closely actual conditions in the blood vessles of the living animal. The free central corpuscles of such a drop preparation are almost exclusively of the circular biconcave disk form. In view of all the evidence there seemed to be no escape from the conclusion that the biconcave disk-shape is the normal, the cup-shape the derived, form of the mammalian erythroplastid.

More recently Arey, of the Northwestern University Medical School in Chicago, has added further proofs of the correctness of this assumption by examining human blood collected for miscroscopic examination directly into human serum instead of any "foreign" diluent or fixative. If evaporation and temperature changes are prevented, such preparations are stated to show usually a few cups, whereas quantities of disks are seen in every field inspected. In diluted serum, however, typical cups may be found in large numbers. Since the form of a corpuscle thus depends on the concentration of its medium, how, asks Arey, can the cup-shape be normal when human serum must be diluted to produce this type?

The blood vessel of a living animal ought to offer a theoretically more favorable condition for the observation of the natural form of the corpuscles. It has been objected that pressure caused in the manipulation of tissues, like the mesentery, which are suitable for miscroscopic observation in life, might alter the normal shapes. Arey has succeeded in averting this alleged difficulty. The erythrocytes were nevertheless almost all of the disk-shaped type. When anesthetics are employed, however, cup-shapes may be found in abundance; they may also be produced in microscopic preparations by treatment

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with traces of volatile substances like ether and chloroform. They represent the abnormal; and it is easy to conceive that the delicately constructed and highly flexible erythrocytes should be subject to ready distortion through the action of reagents.

Arey admits that a limited number of cup-shaped erythrocytes undoubtedly exist in normal blood. Possibly they represent corpuscles whose structure is such that unequal tensions with respect to the osmotic balance exist; perhaps they are old (or young?) corpuscles. In anemias the presence of many cups has been reported, and in fevers it is said cremation may occur. Thus the evidence now available from the examination of drawn blood, diluted in human serum, and from the study of circulating blood in non-anesthetized living mammals justifies, in Arey's belief, the conclusion that the biconcave disk represents the normal shape of the mammalian erythrocyte—the concavo-convex cup being merely an occasional modification.

Edit. J. A. M. A.

INFECTIOUS ANEMIA OF HORSES.*

By R. M. JOHNSON, D. V. M., Member of Graduating Class of 1916, Indiana Veterinary College.

Infectious Anemia of horses, known as Swamp Fever, Malarial Fever, Typhoid Fever and Pernicious Anemia, is a disease affecting the equine species, caused by an invisible filterable organism, the period of incubation of the infective material being from ten days to two weeks. The infection generally occurs in the acute form, but if complicated may terminate in a chronic type.

The disease is characterized by pernicious anemia, intermittent attacks of fever and gradual emaciation; but in spite of these facts the animal has an exceptionally good appetite. Later this stage is followed by a staggering gait, the hind legs being mostly affected. There is also noted a weakness in the region of the loins, and at the same time the pulse increases in rapidity and may run as high as 70, while the temperature varies to a great extent it generally is about 103 degrees or higher. The animal may seem to be improving at times, but usually this is only temporary. Just before death venous regurgitation is well marked and the animal dies from exhaustion.

Diagnosis is usually not difficult especially if the blood is examined. The prognosis is fatal.

The treatment of the disease has up to the present been far from satisfactory. Intestinal antiseptics may be given. A hemotonic consisting of the following: Quinine 40 grains, Fowler's Solution, Nux Vomica, aa. 30 grains, four times daily may also be given. This also in a measure reduces temperature. Cold water, sponge baths, and injections of cold water per rectum seem to produce beneficial results in reducing the temperature and stimulating peristalsis. Purgatives must be avoided and in their place mild laxatives should be given.

In case the fever subsides the above ingredients may be given or a tonic composed of the following drugs may be substituted:

Pwd. Nux Vomica	28 gr.
Pwd. Arsenous Acid	2 gr.
Pwd. Chichona Bark	85 gr.
Pwd. Gentian Root	100 gr.

These should be thoroughly mixed and one-half ounce given at a feed. The prophylactic treatment, as in all other infectious disease, should consist of the separation of the sick from the well and a thorough disinfection of the infected stable.

* Read before the Indiana Veterinary College Association.

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RESISTANCE TO INFECTION.

The accomplishment of an infections, Zinsser writes, is not determined merely by the fact that a micro-organism of a pathogenic species finds lodgment in or on the body of a susceptible individual, but it is further necessary that the invading germ shall be capable of maintaining itself, multiplying and functionating within the new environment. An infection, then, or an infectious disease, is the product of the two factors, invading germ and invaded subject, each factor itself influenced by a number of secondary modifying circumstances, and both influenced materially by such fortuitous conditions as the number or dose of the infecting bacteria, their path of entrance into the body, and the environmental conditions under which the struggle is maintained.

This struggle between the host and the invading bacteria represents a situation in which no adaptation has taken place. The conflict may result in a local or systemic manifestation which constitutes disease. In the majority of cases it becomes "mild and locally limited if the protective powers far outweigh the invasive powers of the micro-organisms, violent if the balance is reversed." If it were possible to discover the various means by which the organism so often successfully exerts its powers of resistance and secures a recovery or immunity from disease, the prospect of therapeutic advance in the management of infections would doubtless be greatly enhanced. For this reason there seems at present to be in experimental medicine a growing tendency to study the precise fate of bacteria under conditions in which they experienced varying degrees of resistance.

The recent studies of Bull at the Rockefeller Institute for Medical Research, New York, are furnishing interesting facts in regard to the deportment of the micro-organisms in the circulation. It now appears quite probable that the power of the blood to cause agglutination determines, in large measure, whether after their direct introduction in an experimental way the bacteria are to be removed promptly from the circulation and septicemia avoided, or whether they are to remain there and produce a blood infection. An inverse ratio seems to exist between the power to produce septicemia and the degree of agglutination of the infection bacteria in the circulation of the host. Thus, according to Bull, virulent pneumococci circulation of the host. Thus, accord- dysentery bacilli of the Shiga type, and virulent influenza bacilli do not agglutinate when injected into the circulation of normal rabbits; while typhoid bacilli, dysentery bacilli of the Flexner group, and nonvirulent influenza bacilli are agglutinated immediately after entering the circulation of these animals. On the other hand, an intravenous injection of a small quantity of specific immune serums causes an instantaneous agglutination of pneumococci and Shiga dysentery bacilli in the circulation of infected rabbits. The bacterial clumps accumulate in the organs in which they are phagocyted.

In this way it appears that active immunity generally insures the agglutination of specific bacteria when they are introduced into the circulation. The degree of agglutination and opsonization of bacteria, whereby they are readily mastered by the protective phagocytes available, within the body, is inversely parallel to the infectiousness of many bacteria for the host. Stryker has recently ascertained that the growth of virulent pneumococci in homologous immune serum produces variations in agglutinability, decrease in virulence, inhibition of capsule formation, increase in phagocytability with normal serum, and change in absorption power and

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antigenic properties. Very few passages through the animal body suffice, however, to induce a reversion to the original type. Bull conservatively points out that the fact of the prominent role or even decisive part played by agglutinins and opsonins in the circulation of infected individuals need not imply that these are the only immunity forces at work or available.

J. A. M. A.

LEUCORRHOEA OR SO-CALLED WHITES.*

By W. A. MARTIN, D. V. M., Member of Graduating Class of 1916, Indiana Veterinary College.

This consists of a more or less copious, slimy or purulent discharge, originating in the vagina or in the womb, and may be acute or chronic.

Among its causes may be mentioned, exposure to cold after foaling; other acute or chronic diseases, such as influenza, glanders, etc., the presence of polypus; melanotic or other kinds of tumors within the vagina or uterus; the existence of recto-vaginal fistula; cancer of the womb; atrophy of the womb, etc.

The treatment should be either local or general.

If the animal is in poor condition, treatment should be assisted by liberal keep on nutritious food.

Among internal remedies may be mentioned, Potassium-arcenitus, one ounce thrice daily, or iron in liberal doses, ginger, gentian sulphur, or any drugs tending to purify the blood or tone up the system in general is very beneficial.

The local treatment should be conducted as follows: By inserting the hand it may be ascertained whether the discharge proceeds from the womb, which is likely to be the case if the cervix or neck of the womb is wide open.

In this case, injection of warm water should be made into this organ with a flexible rubber tube, with a view to washing out the contents; after which by the same means, make injections of tar water, clear lime water, or a solution of sulphate of zinc, half an ounce to each pint of warm water.

I have cured several cases of long standing with a solution of phenol, two drachms to a quart of warm water, inject once to twice daily for one week. Three days will usually effect a cure.

These fluids or solutions should not remain in the womb longer than thirty minutes.

If the womb fills with the discharge readily, place in it two one ounce capsules of boracic-acid with a dram of tincture of iodine in each one, after you have drawn off all fluids injected.

In case of tumor or polypus, they should be removed by ligature or an ecraseur and the part thoroughly cauterized.

*Read before the Indiana Veterinary College Association.

Don't fail to attend the I. V. C. Alumni Association Meeting at Indianapolis, April 11th, 1917

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THE QUANTITATIVE RELATIONSHIP OF MILK-BORNE INFECTION IN THE TRANSMISSION OF HUMAN COMMUNICABLE DISEASES.*

EUGENE R. KELLY, M.D., Boston.

* Read before the Section on Preventive Medicine and Public Health at the Sixty-seventh Annual Session of the American Medical Association, Detroit, June, 1916.

For practical public health administrative purposes the list of human communicable milk-borne diseases that are of importance in the United States may be reduced to five: diphtheria, scarlet fever, septic sore throat, tuberculosis and typhoid fever. The only other group of human diseases which have certain definite claims for admission to this group of communicable diseases are the so-called infantile diarrheas. The entire question of the specificity of the micro-organisms that produce infantile diarrheas and of the part that milk may play in the transmission of such micro-organisms is still so far from definitely settled that it is probably wiser, in considerating the relationship of milk-borne infection to human diseases, to limit its consideration to the diseases first enumerated.

In recent years there has been a great deal of agitation relative to the comparative importance of milk infection in the transmission of human diseases. Whenever the subject is approached in an impartial manner, it is rather astonishing to see how little real basis there is on which to form any definite estimates as to the quantitative importance of milk infection as compared to other modes of infection, such as water, carriers, or direct contact.

Of the five human diseases to be considered, it may be seen at once that tuberculosis represents a distinct problem. The evidence that incriminates cow's milk as a factor in the transmission of tuberculosis to human beings is now quite conclusive. Nevertheless, the data on which are based our quantitative estimates of the prevalence of human tuberculosis of bovine origin are comparatively scanty. This is because of the inherent difficulty in determining in any given case or cases whether or not it is the human or bovine type of the tubercle bacillus that is fundamentally responsible for the disease process. Such researches as those of the British Royal Commission and of the health department of New York City prove that the bovine tubercle bacillus is of frequent occurrence under conditions which render it practically impossible to come to any other conclusion than that the bovine tubercle bacillus is the fundamental cause of the disease process in a wide variety of human tuberculous lesions, especially in children. From these investigations, Park and Krumwiede of the New York City health department concluded that at least one-third of all cases of tuberculosis in children under 5 years of age, as the disease occurred in New York City, were due to infection with the bovine tubercle bacillus and only a slightly less proportion in the cases occurring between 5 and 15 years of age.

The methods that must be employed to demonstrate whether or not it is the bovine or human type of bacillus that is at fault in any given case of tuberculosis are so intricate and involved that it does not seem likely at present that we shall soon have any accurate method of demonstrating the true frequency of bovine tuberculous infection. We will thus rest content with the general assumption that a considerable proportion of the cases of human tuberculosis are in all probability due to infection transmitted from the cow through drinking raw cow's milk.

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With tuberculosis left at one side, the question of the relationship of infected milk to the transmission of disease in cases of the other four diseases, diphtheria, scarlet fever, septic sore throat and typhoid fever, ought to be a very much easier point to determine. Careful and thoroughgoing adherence to the laws of epidemiology, supplemented by equally careful and well co-ordinated laboratory investigations, will in the great majority of instances, in the case of epidemics, prove conclusively whether or not given cases of these diseases may be fairly attributed to milk infection. Nevertheless, at the present time there are apparently very few health departments in the United States that do determine, with even a very rough degree of accuracy, whether or not given outbreaks of disease are due to milk infection. In many instances outbreaks are very evidently alleged to be due to milk infection without any scientific investigations being carried out to verify or disprove this hypothesis.

There are several reasons why it is impossible in most instances to say whether or not milk could reasonably be held to be the channel of infection. It is the exception rather than the rule that any attempt is made to determine the probable source of infection as a routine procedure.

Even if physicians or health officials make an attempt to determine the always possible culpability of milk, they usually carry out the investigation no farther than to establish a suspicious frequency of infection in persons having a common milk supply. Then the outbreak is promptly labeled a milk epidemic and everybody is satisfied with the explanation except the milk man. He, having nothing at stake except perhaps the savings of a life time and a business reputation built up by years of earnest effort, timidly protests against such a harsh and hasty judgment, but his protests are brushed to one side by the cocksure doctor or health board that has condemned him and his products on most incomplete circumstantial evidence alone. Time and again careful epidemiologic investigation has shown that an outbreak that at first appeared to be milk borne has proved to be carrier borne or water borne, and vice versa.

The practical conclusion to be drawn from these facts of common knowledge to sanitarians is that an outbreak of disease may be considered tentatively as probably milk borne on a showing of high frequency of cases on a common milk route or on routes having a common source of supply. This alone is ample evidence to demand prompt administrative action, such as shutting off the supply, or, better, careful pasteurization, an investigation of dairies producing milk and of middlemen handling milk in order to detect the possible source, and such other similar precautionary measures as circumstances may suggest. In order definitely to declare any disease milk borne, however, it is necessary to carry out, by epidemiologic and laboratory means, a careful search for and detection of the disease, or a past history of the disease, in a person or the persons handling the milk at any point, and a thoroughgoing exclusion of all other probable channels of infection. When this perfectly fair and reasonable system of checking is applied to alleged milk-borne epidemics, it is surprising to note how often such epidemics fail to show any clear-cut proof of being milk borne.

Even definite proof of milk being the channel of infection in epidemics may not fairly indicate the total relative importance of milk as a channel of disease transmission.

Although at the present time no definite epidemiologic standards exist as to what is meant by the terms "outbreak" or "epidermic," yet analyses of morbidity reports will nearly

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always show that for the diseases under consideration, one, septic sore throat, is reported almost exclusively in epidemics. In the case of diphtheria, scarlet fever or typhoid, their sporadic or endemic occurrence far outweighs, in the aggregate, their occurrence in epidemics. It is almost unique to have a single or sporadic case of any of these diseases definitely traced to milk infection. It is easy enough to assume that many such cases must be due to infected milk, but to prove it, even to render the case fairly reasonable against milk, is another matter.

A tabulation of investigations of outbreaks and epidemics carried out over a series of five years by the field force of the Massachusetts State Board of Health from 1910 to 1914, inclusive, shows that 240 epidemics and outbreaks of diphtheria, scarlet fever, septic sort throat and typhoid, due to all causes, were investigated. The total number of cases recorded is 3,198, but in many instances a statement is made that the true number of cases is believed to be greater, or that more cases may yet occur subsequent to the report. Because of the policy followed, it is believed that practically every outbreak of any material dimensions of these particular diseases occurring in the state was investigated.

Even assuming for purposes of argument that the admitted incompleteness of cases is as great as 50 per cent., a most liberal concession, this would only assign about 6,000 cases of these diseases to epidemics or outbreaks.

In the same years a grand total of 85,958 cases of these same diseases were officially reported in the state, and this would indicate that the almost unnoticed sporadic or endemic prevalence of these diseases is a vastly greater problem than their occasional epidemic occurrence. No evidence is available pointing to milk infection in any of these sporadic cases. The comparisons shown in Table 1, based on the Massachusetts investigations, are of interest in this connection:

In Table 1 the incidence of more than one case in different families in the same locality at the same time is classed as an epidemic or an outbreak with the natural effect that with three or four exceptions the

TABLE 1.—DATA OF ORIGIN OF THE FOUR CHIEF MILK-BORNE DISEASES

Year	Number of Epidemics	Number Due to Milk	Number Due to Other Causes	Percentage Milk Borne
Diphtheria:				
1910	4	0	4	0
1911	13	1	12	7.7
1912	9	1	8	11
1913	9	0	9	0
1914	26	0	26	0
Total	61	2	59	3.2
Septic sore throat:				
1910	0	0	0	0
1911	1	1	0	100
1912	0	0	0	0
1913	3	2	1	66
1914	2	1	1	50
Total	6	4	2	66
Scarlet fever:				
1910	11	1	10	9
1911	10	1	9	10
1912	8	2	6	25
1913	23	1	22	4.3
1914	35	2	33	6.0
Total	87	7	80	8
Typhoid fever:				
1910	15	10	5	66.6
1911	11	2	9	18.2
1912	6	8	3	50
1913	31	8	23	25.8
1914	23	10	13	43.5
Grand total	240	46	194	19.2
Total	86	33	53	38.4

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average number of cases per epidemic is small. There have been many small outbreaks in which no suspicion has been raised relative to the milk supply that have been handled wholly by local authorities and concerning which no epidemiologic information is recorded in the state department of health. This fact does not invalidate the significance of the table, because for several years past it has been the fixed policy of the department to investigate every case of contagious disease reported from a milk-producing farm, as well as every outbreak, whether in a large or small community, in which milk was at all under suspicion. Therefore a fuller table of outbreaks would only tend to lessen the percentage of milk borne.

In the same connection it is interesting to note that in these five years fifty-five other investigations were made by the state health inspectors of Massachusetts in instances in which a single case of contagious disease was reported from a milk-producing farm, and precautions ordered and observed, with no secondary cases of any nature subsequently occurring.

As regards the occurrence of milk infection in sporadic or nonepidemic cases of these diseases, owing to the fact that Massachusetts local boards of health are required by law to report to the state health authorities only the names, addresses, diagnoses and dates on which cases of infectious diseases are reported to them and that the routine notifications to the state health department are limited strictly to this information, the routine records of cases in the Massachusetts state health department throw no light whatever on the question. During an investigation in 1915 of the entire question of milk in its relation to the public health, the Massachusetts state health department sought to supplement the lack of any routine information in its own records as to frequency of milk infection by requesting information on this point from all of the local boards of health in the state. Accordingly, a circular questionnaire was sent to the local boards of health in the commonwealth, 353 in all, asking for statements as to the total number of cases of typhoid fever, dyptheria, scarlet fever and septic sore throat reported to the local board of health during the five-year period, from 1909 to 1913; the number recorded as due to milk infection following investigation by the local board; the number suspected of being milk borne without conclusive evidence being obtained, and the total number of deaths from the same diseases in the corresponding period and the number of such deaths attributed to milk infection.

Forty towns, having an aggregate population of 50,134, stated that no cases of these diseases due to any causes were reported in this period to their local boards of health. Inasmuch as these "no cases" towns are all comparatively small, it may be reasonably inferred that at least no outbreak of these diseases could have occurred in any of them during the period under inquiry, for such an occurrence would have been practically certain to have become a matter of record in the local board of health office. It is also true that in practically all of these towns, the machinery of milk production and distribution is extremely simple.

The remaining 102 towns and the thirty-four cities, total 136, answering the questionnaire represent an aggregate population of 2,703,759 (census of 1910), or 80 per cent. of the total population of the state. They reported as is shown in Table 2.

Analysis of these totals demonstrates that in only 0.03 per cent. of cases was the transmission of diphtheria definitely assigned to infected milk, and in only 0.19 per cent. was milk either proved or suspected; 1.6

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TABLE 2.—NUMBER OF CASES AND DEATHS DUE TO MILK AND OTHER CAUSES.

Diseases	Number Cases, 1909-1913	Number Deaths, 1909-1913	Number Cases Due to Milk	Number Deaths Due to Milk	Number Cases Milk Suspected*	Deaths Milk Suspected*
Typhoid	11,282	1,425	553	37	135	8
Diphtheria	31,866	2,580	11	1	49	1
Scarlet fever	31,012	991	495	8	57	0
Septic sore throat	2,436	49	1,914	48	0	0
Totals	76,596	5,045	2,973	94	241	9

* "Suspected" here means that milk was considered to be the probable source of infection, but the suspicion was not conclusively proved.

per cent. of the reported cases of scarlet fever were definitely attributed to milk infection, and 1.8 per cent. proved or suspected; in 79 per cent. of the cases of septic sore throat (not reportable in Massachusetts until 1914) milk was assigned as the cause; and in 5 per cent. of the cases of typhoid, milk was definitely assigned as the cause and in 6 per cent. of the cases of typhoid milk was either proved or suspected to be the agent of infection in this disease. Taking all of these diseases in a group, 3.9 per cent. were definitely attributed to milk, and in 4 per cent. of all the cases milk was proved or suspected. Considering mortality, 3 per cent. of typhoid deaths are possibly attributable to milk, 0.08 per cent. of diphtheria deaths, 0.8 per cent. of scarlet fever deaths, and 98 per cent. of septic sore throat deaths; an average for the whole group of 2 per cent. of the deaths may be attributed to infected milk.

CONCLUSIONS

From this statistical study, although it is incomplete in several respects, many interesting and suggestive deductions can be made.

Analysis of Massachusetts investigations does not corroborate the statements to be found in various places in recent literature, alleging that milk is a very important channel of infection in a quantitative sense in this group of diseases.

Massachusetts experience would seem to indicate that even in raw milk supplies, with widely varying conditions of supervision, diphtheria transmission through milk is so rare an occurrence as to be negligible.

The transmission of scarlet fever through milk, while much more common than diphtheria, is of very small percentage significance.

Typhoid fever in this large series, extending over a period of years, was reasonably attributed to milk infection in a much larger number of cases than diphtheria or scarlet fever, but these amounted in all to only 5 per cent. of the total cases of typhoid reported, a very different story from the statements of from 10 to 5 per cent. frequency of typhoid infection by milk that can be found in various places in recent public health literature.

Septic sore throat is par excellence the milk-borne disease, but its occurrence is fortunately relatively rare. When it does occur, it is nearly always in epidemic form and is of more serious consequences.

In all probability, the menace of tuberculosis is the best justification that we have as practical sanitarians for the amount of propaganda that has been carried on and the money that has been expended by health authorities for the supervision and control of milk supplies, so far as such supervision aims at the suppression of communicable diseases.

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I. V. C. A. NOTES.

Meeting November 6.

Essayists:

Dr. Jack Faucett—"Pica or Depraved Appetite."

Dr. Chas. W. Fisher—"Colic in the Horse."

Dr. Clarence K. Rike—"Texas Fever."

Dr. Gustin Blubaugh—"Chokes in the Horse."

Dr. R. M. Johnson, '16, graduate now in government service, made an eloquent talk to seniors pertaining to Texas Fever Quarantine.

Meeting November 13, 1916.

Essayists:

Dr. Stanley M. Friedley—"Pyosepticemia in Sucklings."

Dr. B. J. Duncan—"A Case for Diagnosis."

Dr. John W. Faust—"Diagnosis of Lameness."

Dr. Raymond Bray—"Ascaris Suis."

Meeting November 20, 1916.

Essayists:

Dr. L. M. Friedline—"A Case for Diagnosis."

Dr. C. E. Griffin—"Strychnine Poisoning in Horse."

Dr. Wm. E. Hickey—"Azoturia."

Dr. Mark Boyer—"Liver Fluke."

Meeting November 27, 1916.

Essayists:

Dr. Earl Higgins—"Care of Hog at Time of Vaccination."

Dr. Roy J. Hoch—"Parturient Paresis."

Dr. Lorin L. Breek—"Black Leg."

Meeting December 4, 1916.

Essayists:

Dr. Roscoe Hyde—"Maligamt Oldema."

Frank Car—"How Milk is Made."

Stanley Brewer—"Rabies in Horse."

The association had the pleasure of hearing Dr. Stewart of Texas, who explained the opportunities for veterinarians in Texas.

Meeting December 11, 1916.

Essayists:

Dr. James Hollis—"Phthiriasis, Equidae."

Dr. Vauter S. Huffman—"Glanders."

Dr. W. M. Coffee—"A Case for Diagnosis."

Meeting December 18, 1916.

Essayists:

Dr. Oliver K. Young—"Mycotic Stomatitis."

Dr. Roy C. Lagenaur—"A Thesis on Ergot."

Dr. Harry K. McIntosh—"Rupture of Straight Intestine."

Dr. Howard Corbet—"Acute Infectious Mauritis."

Dr. J. W. Cosby—"Castration of Cryptorchid."

Meeting January 15, 1917.

Essayists:

Dr. Raliegh Miller—"Sun Stroke."

Dr. Frank R. Osborne—"Trachinae Spiralis."

Dr. Grover Pieper—"Acute Dilatation of Stomach."

Dr. E. L. Davidson—"Hog Cholera."

Dr. Lloyd Donnell—"Azoturia."

Meeting January 22, 1917.

Essayists:

Dr. Merit Pennington—"Coryza."

Dr. C. K. Rike—"Chicken Cholera."

Dr. Addison Ross—"Oestrus Ovis."

Dr. Paul S. Dodd—"Bacillary Necrosis."

Dr. Glen F. Eichorn—"Tumor of Large Bowel."

The Abyssinians, who have just deposed their emperor and crowned the daughter of the Emperor Menelik in his place, are a race renowned for their courage and good looks. Of a deep brown in color, they are well formed and handsome; intelligent and fond of gayety, too, but their needs are very simple, and they live in primitive fashion in rough, circular stone huts, thatched with grass.

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ANNUAL MEETING OF THE INDIANA VETERINARY MEDICAL ASSOCIATION.

The twenty-first annual meeting of the Indiana Veterinary Medical Association was held at Indianapolis, January 10 and 11, 1917.

The meeting was called to order by the president, Dr. C. E. Call, of Roachdale, Ind., at 10 a. m., at the Claypool Hotel, where the first day sessions were held. The reports of the various officers, standing and special committees were read, thoroughly discussed and approved. Much was done at the business meeting which will prove a great factor in upholding the dignity of the veterinary profession, and the society passed several resolutions of an ethical nature, which if adhered to by the veterinarians of the state will add much to their efficiency, and will prove a source of satisfaction, not alone to themselves, but also to their patrons.

The officers elected for the ensuing year are as follows: President, Dr. A. L. Nelson, Indianapolis, Ind.; Vice President, Dr. Roy B. Whitesell, Lafayette, Ind.; Secretary, Dr. Geo. H. Roberts, Indianapolis, Ind.; Treasurer, Dr. Jos. W. Klotz, Noblesville, Ind.

Standing and special committee and other appointments to be announced by the president at a later date.

The scientific program was one of great variety, the papers well prepared and well discussed. The sessions of this society will bear very enviable comparison with like sessions of any similar society in the country. The essential feature was that the attendance was large, and the meetings were treated in a spirit of seriousness and earnestness which was highly commendable. If the writer of these notes may be allowed to expand on this phase of the meeting, it might be said that the spirit shown at this meeting proves that times are changing and people with them, for it is still within the memory of the writer, when men went to attend the annual meetings of their several professions, simply for the purpose of reunion with old friends and for a general good time, professional improvement being a side issue; but now members go to a society meeting with but one object in view, i. e., individual and mutual improvement. It is a source of congratulation to the members of the Indiana Veterinary Medical Association, the largest state veterinary society in the country, that, as usual, it is in the van in fostering this new enthusiasm.

The program of the afternoon and evening meetings of January 10th, at the Claypool Hotel, was as follows:

Wednesday Afternoon, 1:30 P. M.

The Indiana Veterinarian, Harvey J. Kannal.

Pruritis or "Mad Itch" in Cattle, Harvey J. Whiffing.

Parturient Paresis, Alonzo Ray.

Parasites in Domestic Animals, T. A. Sigler.

Wednesday Evening, 7:30 P. M.

Abdominal Tumors, C. C. Keller.

Post Mortem Findings of Tumors, W. A. Martin.

Tuberculosis of the Horse, R. E. Woods.

Mixed Infection, L. C. Keegan.

The sessions of January 11th, were held at the Indiana Veterinary College, and were devoted to clinics, under the direction of Mrs. J. W. Klotz, W. B. Craig and Geo. H. Roberts. This session was also exceedingly well attended, and it was remarkable to notice the interest with which the members followed the work of the various operators. Operations performed were as follows:

Chronic Roarer, paralysis on both sides, operated by Dr. T. A. Sigler, Greencastle, Ind., assisted by Dr. W. J. Armour, Goshen, Ind.

Chronic Roarer, left-sided paralysis, operated on by Dr. Feree, Brownsburg,

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Ind., assisted by students of the Indiana Veterinary College.

Chronic Roarer, paralysis on both sides, operated by Dr. Chas. Finch, Jeffersonville, Ind. The standing operation was done.

Tenotomy on left hind foot, operated by Dr. Payson Schwin, Elkhart, Ind.

Tumor (fibroma) on inner aspect of left front leg, operated by Dr. Herron, Tipton, Ind., and Dr. Ferlin, Richmond, Ind.

Chronic Fistula, of Withers, extending completely from the left to the right side, operated by Dr. H. C. White, Kokomo, Ind., assisted by students of the Indiana Veterinary College.

Hydrocele, enlargement of the left side of sheath, with discharging sinus, operation performed by Dr. W. B. Craig, consisted of dissection of the entire mass, and ablation of the cord with ecraseur.

Bouge Spavin, operated by Dr. W. H. Armour, Goshen, Ind.

Spaying of Fox-terrier bitch, operated by Dr. Ferlin, Richmond, Ind.

The various operators were assisted by the following senior students of the Indiana Veterinary College:

Clinical Clerk, M. J. McGinty; Operator's Assistants, F. A. Osborn, L. Friedline, E. Hickey, O. Archer, H. Roquette and M. Bottema.

The United States bureau of fisheries, in the course of its work of introducing the grayfish as a food, learned that a canning concern on Puget sound was putting up 10,000 cases (480,000 cans) of grayfish of its own motion and at its own risk and expense, using the plant and machinery devoted to canning salmon during the regular season. The canners have found that the mechanical apparatus of the salmon equipment, which reduces hand labor to a minimum, is applicable to the canning of grayfish.

POISONOUS PROPERTIES OF THE MARSH MARIGOLD.

The marsh marigold (Caltha palustris), which brightens our northern marshes and stream banks with its yellow flowers and dark green foliage in early spring, generally before the snow has entirely melted, is familiar to most of us. The stems and leaves are extensively gathered in early spring and cooked for greens, making one of the best pot herbs. The plant belongs to the Ranunculaceae or crowfoot family. Statements in the literature concerning the poisonous properties of the marsh marigold are confusing. Some writers state that it is poisonous in a green state, but that its poisonous principles are dissipated by heat; others that it contains an alkaloid identical with nicotin, though this has been disputed; a few that it contains an acrid substance identical with the oil of ranunculus; still others that if fed to stock with hay it causes diarrhea and stoppage of the flow of milk. A recent investigation of the fresh plant by Poulsson shows the presence of anemonin, already known in many other members of the crowfoot family, and of cholin. Anemonin is a camphor-like, poisonous substance, having the formula $C_{15}H_{12}O_6$. It was evidently the volatile, mildly toxic base cholin which in earlier examinations was mistaken for nicotin. Alkaloids were not found. From the results of the chemical investigation as well as from past experience in the use of the plant, it is evident that there is little danger in using the marsh marigold for greens, at least if precautions are taken to insure its thorough cooking.

J. A. M. A.

The first lead pencil, or graphite pencil, was made in England during the reign of Queen Elizabeth.

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CLASS NOTES

SENIOR NOTES.

Gus. Roth, Reporter.

Dr. Bruner says: "A pig being delivered every twelve hours is doing fine. It makes no difference if they are dead. Patience, boys, is all it takes, and I've got it to burn." Alta's some smoke.

James Hollis, soon to be Dr. Hollis, will specialize in canine and feline surgery.

If Hock can't spay a feline any better than that, we would advise the doctor not to hold any more Freshman clinics.

It seems it would sound much better if the Freshmen would not use the term Doctor or Dock to their names so often. We know you are represented from California to Maine, plus some wise heads, and even if Sipe is a passed civil engineer, butcher, blacksmith, salesman, private instructor for Dr. Kranz of Junior class, you all lack a 'L' of a lot of being a Doctor yet.

We all think our friend's new speckled cap's a dinger. They all want to eat it. It looks like an Elberta peach.

Jim, if you let that pan boil dry, by all that's good and holy, you'll get canned. Heads up, Jimmie.

Professor: "Burton, what kind of a joint does it form?"

True Moore: "I can't tell."

Professor: "Why I haven't asked you a question yet."

Now I know Burton passed his exam. with a pony. No wonder he made 100.

Professor Lagenauer—"A mordant in chemistry is an agent used to set a dye", which was nicely explained, but Dr. Young, from Oklahoma, says a plaster paris bandage is a mordant. Well, Young's from Oklahoma; nuf said.

Dr. Bartlow, the "everready," says that Dr. Craig has already picked him as the star of the class, and that it is simply amusing to sit back and listen to the other boys try and answer the anatomy questions. It's hot from the wire and we know how promptly and efficiently Bartlow answers up. Dr. Granpaw Bartlow says his calls are to be made either in a Pierce Arrow or a Packard any time after April 15. Heads up, boy, Bart's getting the lead.

Recently during a lecture hour Dr. Young took the floor quizing Dr. Jaeger for fifteen minutes. Finally Dr. Jaeger said: "Gentlemen, now that we've had a recess, let's continue with the lecture." Oh! you Young.

William James, alias Billy, the idol of Martinsville, the soap box orator, politician, pool player, in fact the jack of them all, says: "Who got this country into its first big mess; who was the cause of this big grab being pulled off of this Wall Street leak, and lastly who's trying to mutilate and tear up this office of state veterinarian, and now who's going to save the day?"

"Don't tell me," quotes Bill, "I've spent four years in Greenwood; dollar down, three fifty per dozen."

That's enough Bill, you are now crowned the sure nuf politician of the '17 Senior class with bells.

Weren't we sure pleased to see so many of the last year's Seniors here during the Indiana State Veterinary meeting. Everyone looked fine and prosperous. We, as a body, wish them well for all time.

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When the Indiana Veterinary Colloge came into existence it was little thought that it was to have enrolled among its students one who was to stand out so prominently as a notable inventor. Many lectures have been given and many are its graduates who have done great and good things. One of the greatest has been Dr. Roberts' grasshopper cathartic, now put on the shelf, for there has come the greatest of them all, which will no doubt hold its place for ages. From our Senior classmate comes this invention: Dr. McGinty's "submarine" cathartic. It is so powerful, wonderful and efficient that when Dr. Wyatt took one and put it under his silo, down in Warren county, in thirty minutes its entire contents were sent over to the other side of the county. Some wonder! Mac will finish his course, however, but not to practice, as his future is made already. He is corresponding with European countries to buy his new discovery. Mac says: "Boys, she's there; stronger than Mary's breath."

Wyatt says: "To improve the world, begin by improving yourself."

Friedline says: "Some people are always grumbling because roses have thorns. Let's be thankful that thorns have roses."

Osborn says: "There is always room at the bottom or so many people wouldn't go there."

Boys, this is the last time we get the "Bulletin" as students of the I. V. C. Let's forget and cast aside every little thing that is and has been a worry to us. We are nearing the goal—hope to do what no other Senior class has ever done. It's a small load if we all stand shoulder to shoulder, altogether, a good "heave" and the load is over the hill—a big sigh of relief —and we go forth as full fledged doctors of veterinary medicine.

Junior
Say
Come away,
See a play
Today.
Through East Market
We will gently stray.
What's the use of toiling your life away?
Say come away,
Let's' see a play today.

Seniors
Say
Go away,
No play
Today.
How can I get my lessons if I see a play?
I've got to bone some to make an A
On McCleay.
Say
Go away,
No show
Today.

JUNIOR NOTES.

L. J. Etnire, Reporter; Howard Corbett, Asst. Reporter.

The students in our class who are married and have families are supposed to pose as models for the rest of us, but oh, my, how they fall short. For instance, we had a nice young lady visitor some time ago, an expert basketball player, who showed us a few passes, but it was impossible for we youngsters to get near because of these infernal victims of hymen.

Morris woke up in Dr. Jaeger's class just in time to impart the terrible news that a hereditary immunity was one which occurs in the form of an epizootic affecting a group of people in a given community at certain times of the year.

We have with us this morning a gentleman known both far and near

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for his oratorical powers and who enjoys an international reputation for his fluency and perfect diction, Wayne Alter, now a student of I. V. C., who likes to take up Dr. Jaeger's valuable time lecturing to the class. (By the doctor's request.)

At last! All old-time cure-alls may be laid away. We have performed the impossible; discovered the undiscoverable and unearthed a secret which the Germans would give a million for. Nutter has found it! And all by accident! Its the new drug reumunotomy, gentlemen, given in grain doses, and is guaranteed or money refunded.

Along with veterinary lessons Homan and Eichorn are now giving painting lessons on the side, and they have been known to give some very good examples of decorating. They have sworn off since New Year's.

When we were kids we used to give a certain number of pins or fish hooks, etc., to see a neighborhood boy's circus, but we had almost forgotten it until Lindley was requested to have matches for Dr. Craig's cigars before he can be admitted to class.

Bannister rides the cars to and from his home, six miles north of the city. One association night he felt sleepy on the car so left word with the porter to wake him up at his station, but as sometimes happens he was carried over to a distant city. Consequently lodging bill in a foreign city ten bucks, and a near divorce suit from his wife for failing to report home at night.

For the education of the ignorant and the furthering of our profession, we would like to say that it is against the laws of our county for a freshman to attach a prefix to his name, not even Mr., let alone Dr., and we would appreciate their adhering tot he law, especially when their name appears in public as they do in the college bulletin.

Russell Urick, after getting the opinion of the Junior class as individuals, consulting a deck of cards, three palmists and a fortune teller, gazing into a crystal and some tea cups and wearing a charm procured from a cross-eyed negro, decided to stay in Indianapolis through the Christmas vacation. Such decisions are only reached after mature thought.

W. G. Flora, whose ideas tramp on each other and often stampede on their way out, declares a speculum is a necessary adjuct for the introducing of the stomach tube via the nostrils.

The beauty contest now rages between the masculine perfection of Dr. Ruddle of the Juniors and the classic features of Dr. Ayres of the Freshman.

"Dad" Kempston purchased an outdoor kimona to fend off the festive zephyrs of January and February, having garnered the amount from his trusting friends who expressed their confidence in a monetary manner on national results in November.

Dr. Carl Hall managed to leave his extensive Brownsburg practice and attend the State Veterinary Association.

Dr. Craig's dissecting room motto: "Hew to the bone; let the meat hit whom it will."

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Coffee and Breeke, whom the Great Eastern tolerates for a few hours every night, were visited by two friends, Thomas and Jeremiah, recently. Breeke claims they are doggoned dangerous friends, as Coffee persisted in claiming that the border of the wall paper was a garden of carrots and wanted to harvest them with a Gillette.

A credit of four hours in dissection will be given to the first three correct answers as to the identity of the faculty members who never fail to use the following characteristic expressions:

"Kee-e-ep still!!! Neee-e-ow."

"Ah-h-hem, ah, the bacillus, etc."

"The airon compounds are under consideration today."

"I wish to acquaint you with fluid extracts, a few of the preparations and their working formula, gentlemen."

FRESHMAN NOTES.

C. C. Sipe, Reporter.

Dr. Jaeger: May I beg of you sufficient space in the next issue of the Bulletin of Comparative Medicine, published for the Doctors, who uphold the dignity of this profession to apologize for my fellow students and self for infringing upon their prefix of Doctor in our last issue of the Bulletin. After entering this college and coming in contact with our Senior and Junior fellow students and listening to their various technical discussions and judging from their real ability on said subjects we could see where they had nothing on us excepting the highly honored prefix of "Doctor" to their name; and after a visit to one of their association meetings, and listening with keen ear, one could readily judge that there are several "Sweet Cookies" in the said realm of Doctors who uphold the dignity of the Veterinary Science.

Yours truly,

C. C. SIPE,

Reporter of Just the Freshmen.

Holman, in discussing turkey, states that turkeys raised in Mississippi are of a higher flavor than those raised in Indiana. But we rather think he means chicken. For surely no turkey would induce a man to make a trip to the state of Mississippi, for a visit of one short week.

In addressing Mr. Maze in the future please address him a Mr. "Pussy Foot."

Jimmey states the Wa Wa is convex from before upwards, and of course Jimmey enjoys creating something original for his fellow students; but Jimmey, you will have to go some to uphold the dignity of the profession.

One sure bet! If Dr. McGinity is as good an authority on Veterinary Science as he is on parliamentary law, he sure will be a commoner.

The freshman class has something on the senior and junior classes at last, and that is it contains "malted milk twins."

Notice ! All students of the I. V. C. and members of the Association, that take any interest in their meetings at all, should avoid being absent from now on, for fear of missing the one big event of the year. This being the meeting at which the "soup-bone quartet" will entertain, owing to the fact that they represent all of the classes of the college, it should be a great success, especially on the part of Dr. Ruth, or "Sweet Cookie," of the seniors; Dr. Kranze, conceited king of "Amen Alley," from the junior class, and our "Dear Little Dingle" or Messrs. McDonald and Sipe, of the freshman class.

We are all rather annoyed by one peculiar obstacle and that is the definition of hinge lubrication, which we heard "in there where they cut 'em out."

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Mr. Walsh, while trimming a horse hoof the other afternoon, looked up at his fellow students and with his Swedish smile, stated that the horse's hoof smelled as nauseous as his own feet. If this should be the fact, the freshman class has been mislead all this time for we always attributed it to Andy's pipe and not his feet.

Mr. Hedges, "or the half role kid from the Blue Ridge Mountains of Virginia," should have purchased a left handed dissecting case, instead of the one he has. But now he knows better for Dr. Craig has informed him to use left handed knives only in his surgery work.

McDonald's Christmas presents included several valuable gifts, principally, artificial butter colorings; a lamb radius; a pail of hog kidneys; four hog trotters; one pound pure pork sausage; real bone marrow; cardiac muscle fiber part of the glut eneous, and a few of the ball and socket joints of a cow.

Turner has found a rather peculiar object in the dissecting room, too deep for any of us to comprehend, so we must take his word for it, that it is a "cocked ankle," which Strangeways has omitted to mention.

Ayers upon entering the dissecting room, has decided to give up the profession of Veterinary Science. One might grasp the opinion that he is a post graduate student.

Keeping up his natural reputation, he asked the professor to be taught how to measure bacteria, and not being able to comprehend, asked if a circle square would answer the purpose.

Mr. G. Winslow spent a pleasant vacation with his brother John, who resides in Marion, Ind.

We are very thankful to state at this writing that our fellow classmate, Mr. Stapp, who met with a very serious accident during his Thanksgiving vacation, is again with us.

Mr. Jacoby, after recuperating at his home in Thorntown, Ind., during his vacation, has resumed his duty of occupying space in the freshman class.

Mr. Foor, one of our malted milk twins, gave a little recreation party to a few of his classmates within the last fortnight, including Maze, Hedges, Edwards, Shirley and Mr. Bates. After this occasion a notice of reward has been posted for the return of one pair of trousers, one black necktie and one suit of underwear.

Mr. Shirley's parents at last have relented and allowed their son Ray to carry a pocket knife but only on a chain and the next to expect from him will be a match case with real matches in it.

Lumbago is what Sherman said war was. "Ask Dad, he knows". I mean Mr. Dowling. Even at that Charles Chaplin has nothing like Mr. Dowling's Lumbagous Shuffle.

Candy should never be distributed by parcel post delivery, for fear that upon its arrival, it would have changed from glucose to a deck of playing cards and a few panatella cigars. Ask Gibson, he had this misfortune.

Mr. P. Stafford's anxious question after listening to his introduction lecture on Mounting Bacteria: He wanted to know if the microscopes in use in the laboratory at present, were large enough to detect live bacteria; and the professor's prompt response was: What, do you think you need a telescope?

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ALUMNI NOTES

Alumni of the Indiana Veterinary College are cordially invited to send original articles or case reports to The Bulletin of Comparative Medicine and Surgery for publication.

Alumni are also requested to send us all items of interest regarding themselves, such as marriage notices, death of brother alumni or members of family, change of address, or any professional, civil or social honors which may be conferred upon them.

TO THE ALUMNI.

Twenty-five years ago, I. V. C. was established, and has gradually risen from a modestly housed, unknown institution to one of the greatest and best known institutions of learning in the world. It is with great pride that I appeal to every member of the Alumni to make a special effort to be present at the next meeting. We are one of the most rapidly progressing professions of the day and I believe that every one of our hearts should beat just a little stronger when we say, "I am a Veterinarian, upon my professional ability rests the future of the livestock industry." Especially should this be true of every graduate of the old I. V. C., for her buildings and laboratories are the best, most modern and up-to-date; her faculty could not be improved upon and her graduates, hundreds of them in all parts of the world, are living testimonials of her greatness.

Something fitting should be done to celebrate the 25th anniversary of the founding of the Indiana Veterinary College. She is growing older, but improves with age. The firm rock upon which she is established will endure for years—probably time immemorial. Many of us will not be here to wish her God speed in twenty-five years hence, so let us do it now. Your presence will help in this celebration, so come—come back to your Alma Mater on this day—she loves you as I am sure you love her. Meet your friends of college days and talk over old times and although the dear old school may have changed in appearance since you knew her best, you will find that the same old feeling of good fellowship still prevails. Come!

LA RUE E. DAVIS, '11.
Sec'y. Alumni Assn., I. V. C.

The alumni of the I. V. C. was so well represented at the Indiana Veterinary Medical Association, January 10th and 11th, 1917, that for fear of slighting some who may have been overlooked in the rush, we make no attempt to give a list of names. It certainly was good to see the old boys get together and talk over old times at the school; and every now and then one would come upon two or three standing together in a corner, heartily laughing over some college escapade. This is the right spirit. The "get together" movement is here to stay. Nothing does a man in active practice so much good, as to go to gatherings, where he may meet old schoolmates and friends and fellow practitioners and talk over old times and get new ideas. Therefore, don't fail to come to the alumni meeting in April.

Dear Doctor: Congratulations are now in order, for I am the father of a very fine boy, named for his grandfather, Emmett T. Davis, Jr., He arrived at 1:30 a. m., January 6, 1917. Both mother and son are doing fine. He is an eight-pounder and is ready to accept the challenge of any one of like weight and age, 20 rounds to a decision. I shall make arrangements at once to enter Emmett T. Davis, Jr., as a student of the I. V. C.

Respectfully,
LA RUE DAVIS, D. V. M.

Editor's Note: Dr. Davis, Jr., is right in style. Modern pugilists do most of their fighting verbally and we don't doubt that at present the young gentleman is quite a champion in lung power.

The Alumni, students and faculty of the I. V. C. extend to Dr. and Mrs. Davis, their hearty congratulations upon the advent of their son and heir.

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The following letter and article arrived too late for publication in the November issue:

San Diego, Cal., Oct. 30, 1916.

Dr. A. S. Jaeger,
Indianapolis, Ind.

Dear Doctor: I enclose an article which might interest the students of the I. V. C.

Trusting you are having a prosperous year at the I. V. C.

Everything has been very quiet in California this year. My business keeps about the same but collections are very slow. We look for better times after election.

Yours truly,
F. S. LAW.

Queen, Who Lost Her Puppies, and Orphaned Kittens Make Happy Family.

One bulldog mother that lost her pups and two baby mountain lions that lost their mother were brought together at the Exposition yesterday, establishing considerable doubt as to which was the happier.

The mountain lions were received by Superintendent F. G. Kaufman Wednesday from Grants Pass, Ore., after their mother had been killed at the time of their capture. The problem that confronted Kaufman was to find a "wet nurse" for the babies, and while he was advertising for a life-saver for his wild kittens, a baby's bottle and nipple, were brought into use to keep the little animals alive.

Yesterday Dr. F. S. Law, city veterinarian, learned of a tragedy in the family of Queen, a pretty, white bulldog, whose pups were born October 20 and died a few days later. Kaufman immediately purchased the dog and introduced her to his kittens at the Exposition zoo. The meeting proved happy to all parties concerned and the mother appears as proud of her adopted babies as she was of her own pups. As for the kittens—well they were hungry.

The babies have been named Tom and Tilly and yesterday received the compliments of hundreds of Exposition visitors who kept the zoo attendants busy explaining their interesting case.

November 26, 1916.

Dr. A. S. Jaeger,
Indianapolis, Ind.

Dear Doctor: How are you and all of the I. V. C. boys and do you have as much real pleasure teaching the dear Seniors this year as you did that **Noble Class** last year? But you did make one sad mistake when you graduated me and told me never to return, don't you remember? What a fine old man and such a studious young man, how good I was to you all of the three long years. But Doctor, I have settled down to real study now. I have the honor of being the private veterinarian for O. C. Barber on the Anna Dean Farm at Barberton, Ohio. He has 650 fine Guernsey cattle and 125 horses. This is the largest farm in the world. He prides himself on having the best Guernsey cow in the world, the most pheasants, squabs, ducks, chickens and hogs, two thousand acres of farm land and the Diamond Match factory on the corner of the farm. That is the place where he made his money.

Now, Doctor, please give all the people my regards and I wish I was back with you.

Best regards to all from Dr. T. A. Marshall, Barberton, Ohio.

A department of the New Jersey agricultural experiment station has recently succeeded in producing purple carnations.

Maracaibo, the leading port in western Venezuela, is a city of some 50,000 inhabitants and the capital of the state of Zulia.

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The Bulletin of Comparative Medicine and Surgery

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DR. A. S. JAEGER, - . Editor-in-Chief

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Subscription Price - - - - - - - - - - - -$1.00 Per Yea.

OPPORTUNITIES FOR THE VETERINARIAN

It is still within the memories of most when the veterinarian's activity was practically limited to the ministration of sick animals, and the time will probably never come when the need for competent general practitioners of comparative medicine shall have passed; for such practice will continue to be materially profitable and constantly more scientifically satisfactory and there need be no fear that the number of properly prepared men in the field will fall short of the demand.

For those, however, who, either because they do not feel themselves temperamently fitted, or because of its exactitudes, do not care to enter independent field work, the scope of opportunity for well directed veterinary endeavor is becoming more and more pronounced.

It will be of interest to enumerate just a few of the lines which a well qualified veterinarian may follow with profit and satisfaction. It is hardly necessary to more than mention the opportunities open in the United States Bureau of Animal Industry, but many do not know that there are similar positions open in the Philippine and Porto Rican service, nor that the South American countries welcome American veterinarians into their animal industry services. It might be said that in the past the salaries paid by our own federal department have not been commensurate with the high class services exacted, but if we are correctly informed a bill has been passed increasing the pay in all grades, a bill has been passed authorizing employes disability compensation, and it is only a question of comparatively short time before old age pensions in this department will be an established fact. On the whole service in the B. A. I. has much to commend it, and should be especially attractive to one who is satisfied with a moderate but absolutely safe and assured income. Most states and many municipalities offer many inviting positions to veterinarians and while the salaries are as large or even larger than those in the federal service, it should be remembered that they are usually not under civil service rule, and the length of service depending as they so frequently do, upon political expediency and administration changes, makes them less attractive and secure than federal service positions.

The present European war has proven the need for an adequate and competent veterinary as well as medical corps, and it is to be hoped that our own country will profit by the lessons taught, and see the reasonableness of improving the army veterinary corps, so that at all times it may prove itself sufficiently strong to competently meet its responsibilities. Those who are now in the army are enthusiastic. Veterinarians rank as commissioned officers and receive the same pay and allowances as officers of like rank in other arms of the service. In consideration of the universal respect accorded an United States Army officer; the periodical promotions with attendant increase in pay; the very liberal pay for life, upon retirement for age or disability; the many opportu-

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nities for scientific self improvement; and the excellent social environment, this service should prove very attractive to many young veterinarians.

In the so-called commercial field, opportunities are practically unlimited. Within the last few years a considerable number of hog-cholera serum plants have been established, and the end is not yet, each employing a certain number of veterinarians at very good salaries. There are also quite a number of biological laboratories making serums, vaccines and therapeutic agents extracted from animal organs, all employing veterinarians. These plants and laboratories are here to stay and the number of them will increase in the future, so that it may be seen that the opportunies of veterinarians are unrivaled.

OBITUARY.

CLYDE C. SIPE
Died January 29, 1917.

Just as we go to press we are informed of, and regretfully announce, the death of Clyde C. Sipe, a freshman student of the Indiana Veterinary College, which occurred Monday, January 29, 1917, at 3:00 a. m. He was in good health until the Thursday preceding his death, when during the night he developed an inflammation of the throat which rapidly went on to abscess formation. He was at once attended by a competent throat specialist, and by Sunday was seemingly on the road to recovery, when suddenly early Monday morning he suffered a collapse, and died before a physician could reach him.

Mr. Sipe was born at Union City, Ind., 27 years ago, and was married to Miss Mona Grubbs about 8 years ago. Besides the widow, he leaves behind a mother and brother. The young wife is especially to be sympathized with, for she lost her father but six weeks ago.

The passing away of Clyde C. Sipe has cast a pall of gloom and sorrow over the Indiana Veterinary College, which will not be rapidly dissipated. Though he had attended the college only since September, 1916, being a freshman student, his pleasing personality and happy disposition had endeared him not only to his fellow classmen, but also to the entire student-body and faculty of the school, and the announcement of the death of "Smiling Sipe" filled the hearts of all with sorrow and regret.

To the sorrowing widow and relatives, the faculty and students of the Indiana Veterinary College wish to extend their sincere sympathy and condolences, and trust that our Father in Heaven will make them strong in their hour of grief.

ATTENTION, DOCTORS OF MEDICINE, VETERINARIANS AND DENTISTS.

Do your share toward preventing the passing of new or the amending of old laws deterimental to your professions and the public. This may best be done through personal endeavors with your Senators and Representatives.

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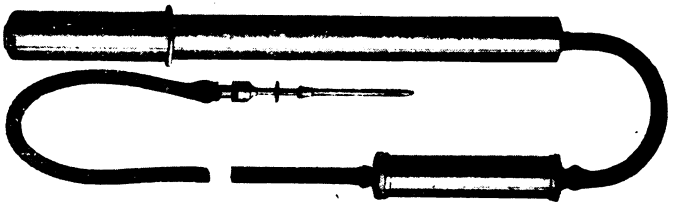
Indian Milk Fever Outfit

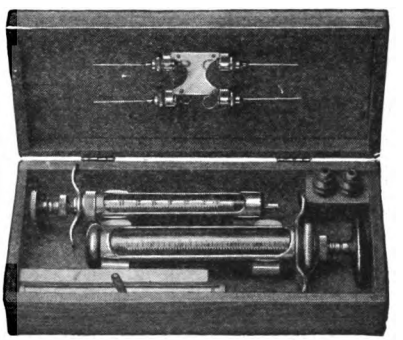


This is a very practical outfit. It has no rubber bulbs to wear out, is easy to operate and certain in results. Uniform pressure sustained by tube with valve, All working parts are made from metal. Will not wear out.

Price . . . $2.50

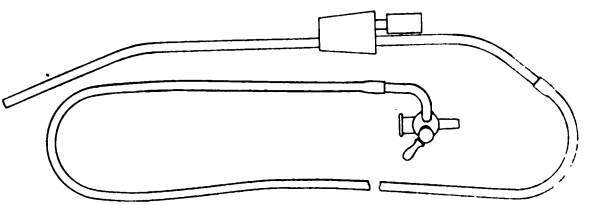
Viking Simultaneous Outfit

This oufit is adapted to the simultaneous method of treatment with Virus and Hog Cholera Serum where a reliable medium priced outfit is desired. It consists of an 8cc Virus and 30 cc Serum Syringe, four Viking 16 ga. 1 in. Needles, slip and screw adapters. All in a polished wood case,



For $8.00

Prices of Viking Syringes only: 8cc $2.25; 20 cc, $3.00; 30 cc, $3.50; 45 cc, $4.25; 60 cc, $4.50; 80 cc, $5.75.



Big-O Attachment

This attachment is the most practical syringe filler on the market. It consists of a two-way stopcock, four feet of rubber tubing, metal tube and thistle tube for ventilation

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Indiana Veterinary Supply Co.

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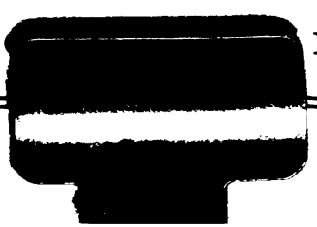

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The highest possible degree of immunity to hog cholera.

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Safety First and safety when penny saving practitioners are paying with their reputations for money foolishly saved on the cost of serum.

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